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| **Study program** Chemistry | | | | |
| **Course title** Chemical bond theory | | | | |
| **Name of lecturer/lecturers** Dragan M. Đorđević | | | | |
| **Type of course** Elective | | | | |
| **Number of ECTS allocated** 4 | | | | |
| **Course objectives**  Understanding the basic principles that lead to the formation of permanent bonding interactions between atoms  in molecules. Ability to predict properties of molecules based on bond type. | | | | |
| **Course outcomes**  Upon successful completion of this course, the student is able to:  • understands the principles that lead to the formation of molecules,  • predict the type of bond in molecules  • understand the basic properties of molecules based on the type of bond  • predict methods for testing inorganic compounds. | | | | |
| **SYLLABUS**  *Lectures*  Fundamentals of wave mechanics, wave function, wave motion, function normalization, wave  equation. A hydrogen atom. Atomic orbitals s, p, d, f. Multi-electron molecules. Energy states of atoms and spectral terms. Chemical bond, molecular orbitals. LCAO molecule A2. MO of the molecule type AB and other multi-electron molecules. Valence bond theory. Ionic bond. Molecular crystals, metal structures. Intermolecular interactions.  *Practical work*  A historical approach to the problem of the atom structure. Atomic structure and electronic configuration.  Calculation of wave functions of atomic s, p, d, f orbitals. Energy states of free atoms and atoms in the molecule. Historical approach to the problem chemical bonds. MO theory and MO diagrams of different types of molecules. Wave functions for molecular orbitals. Physical and chemical properties of compounds with covalent and ionic bonds. Molecular symmetry and molecular spectra. | | | | |
| **References**  I.O. Juranić, Hemijska veza. Hemijski fakultet, Beograd, 1994.  I. Filipović, S. Lipanović, Opća i anorganska kemija. Školska knjiga, Zagreb, 1990.  N. Milić, Neorganska kompleksna i klasterna jedinjenja. PMF, Kragujevac, 1998. | | | | |
| **Active teaching classes** | **Lectures** 30 | | **Laboratory work** 15 | |
| **Teaching mode** lectures, theoretical exercise | | | | |
| **ASSESSMENT METHODS AND CRITERIA (Max 100 points)** | | | | |
| **Pre exam duties** | **Points** | **Final exam** | | **Points** |
| Activity during lectures | 5 | Written examination | |  |
| Practical teaching | 5 | Oral examination | | 30 |
| Teaching colloquia | 60 |  | |  |
| Seminar |  |  | |  |